

Amendments to the Claims:

The following claims will replace all prior versions of the claims in this application (in the unlikely event that no claims follow herein, the previously pending claims will remain):

1-41. (Cancelled).

42. (New) A process for sintering polyethylene having a weight average molecular weight of more than 1,000,000 g/mol, said process comprising:

- (a) at least partly disentangling said polyethylene;
- (b) heating the at least partly disentangled polyethylene to a temperature between room temperature and the crystalline melting temperature of the polyethylene;
- (c) compacting the at least partly disentangled polyethylene at a temperature between room temperature and the crystalline melting temperature of the polyethylene;
- (d) heating the compacted polyethylene to a temperature above its crystalline melting temperature;
- (e) cooling the polyethylene to a temperature below its crystalline melting temperature.

43. (New) The process of claim 42, wherein said at least partly disentangling is effected by a process comprising swelling said polyethylene.

44. (New) The process according to claim 42, wherein said weight average molecular weight is at least 2,000,0000 g/mol.

45. (New) The process according to claim 42, wherein said temperature between room temperature and the crystalline melting temperatures in steps (b) and (c) is at least 60°C.

46. (New) The process according to claim 42, wherein said temperature between room temperature and the crystalline melting temperatures in steps (b) and (c) is at least 100°C.

47. (New) The process according to claim 42, wherein said temperature above its crystalline melting temperature in step (d) is below 250°C.

48. (New) The process according to claim 42, wherein said process further comprises post-treating said polyethylene after at least steps (a)-(d).

49. (New) The process according to claim 48, wherein said post-treating includes cross-linking said polyethylene.

50. (New) A process for sintering polyethylene, said polyethylene having

(i) a weight average molecular weight in the range of 2,000,000-10,000,000 g/mol;

(ii) a co-monomer content of up to 5 wt%; and

(iii) a melting temperature of at least 115°C; and

said process comprising

(a) heating said polyethylene to a temperature between room temperature and the crystalline melting temperature of the polyethylene;

(b) compacting said polyethylene at a temperature between room temperature and the crystalline melting temperature of said polyethylene.

(c) heating the compacted polyethylene to a temperature above its crystalline melting temperature;

(d) cooling the polyethylene to a temperature below its crystalline melting temperature; and

(e) cross-linking said polyethylene after at least steps (a)-(c).

51. (New) The process according to claim 50, wherein said temperature between room temperature and the crystalline melting temperatures in steps (a) and (b) is at least 60°C.

52. (New) The process according to claim 50, wherein said temperature between room temperature and the crystalline melting temperatures in steps (a) and (b) is at least 100°C.

53. (New) The process according to claim 50, wherein said temperature above its crystalline melting temperature in step (c) is below 250°C.

54. (New) The process according to claim 50, wherein said compacting of said polyethylene is effected with a pressure in the range of 10-200 MPa.

55. (New) The process according to claim 50, wherein said polyethylene comprises co-monomer.

56. (New) The process according to claim 50, wherein said polyethylene comprises 0.5-5 wt% co-monomer.

57. (New) A process comprising a sintering polyethylene, said polyethylene having

- (a) a weight average molecular weight in the range of 2,000,000-10,000,000 g/mol;
- (b) a co-monomer content of 0.5-5 wt%; and
- (c) a melting temperature of at least 115°C.

58. (New) The process according to claim 50, wherein said weight average molecular weight is at least 5,000,000 g/mol.

59. (New) An article obtained by a process according to claim 50.

60. (New) The article of claim 59, wherein said article has a wear coefficient of less than $3.5 \cdot 10^{-4} \text{ mm}^3/\text{mN}$.

61. (New) The article of claim 59, wherein said article has a wear coefficient of less than $2.5 \cdot 10^{-4} \text{ mm}^3/\text{mN}$.

62. (New) The article according to claim 59, wherein said article has a yield strength of at least 5 MPa.

63. (New) The article according to claim 59, wherein said article has a yield strength of at least 20 MPa.

64. (New) The article according to claim 59, wherein said article has a tensile strength of at least 10 MPa.

65. (New) The article according to claim 59, wherein said article has a tensile strength of at least 40 MPa.

66. (New) The article according to claim 59, wherein said article is selected from the group consisting of artificial implants and orthopedic implants.